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**Declarations under Rule 4.17:**

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- of inventorship (Rule 4.17(iv)) for US only

**Published:**

- with international search report

(88) Date of publication of the international search report:  
16 June 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **STREPTOCOCCUS AGALACTIAE ANTIGENS I + II**

(57) Abstract: The present invention discloses isolated nucleic acid molecules encoding a hyperimmune serum reactive antigen or a fragment thereof as well as hyperimmune serum reactive antigens or fragments thereof from *S. agalactiae*, methods for isolating such antigens and specific uses thereof.



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# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/EP2004/004856

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07K14/315 A61K39/09 C12N15/31 C07K16/12 C12Q1/68  
C12N15/11 G01N33/50

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, EMBASE, MEDLINE, WPI Data, Sequence Search

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE EMBL 12 September 2002 (2002-09-12), GLASER ET AL.: "Sterptococcus agalactiae NEM316 complete genome, segment 2" XP002304476 Database accession no. AL766844 *page 4 last line- page 5 line 18* *sequence positions 16023-17678 pages 58 and 59*</p> <p style="text-align: center;">----- -/-</p>	<p>1,2, 5-11, 14-16</p>



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

9 November 2004

Date of mailing of the international search report

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/004856

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE EMBL 2 September 2002 (2002-09-02), TETTELIN ET AL.: "Streptococcus agalactiae 2603V/R section 8 of 100 of the complete genome" XP002304477 Database accession no. AE014198 *page 2 line 43 to line 63* *page 6 sequence positions 4387-6042*</p>	1,2, 5-11, 14-16
Y	<p>WO 02/059148 A (CISTEM BIOTECHNOLOGIES GMBH ; AHSEN UWE (AT); ETZ HILDEGARD (AT); HAFN) 1 August 2002 (2002-08-01) cited in the application page 10, line 20 - line 21; examples 1-7 page 4, line 8 - page 10, line 9</p>	1,2, 5-11, 14-37
Y	<p>ETZ H ET AL: "Identification of in vivo expressed vaccine candidate antigens from Staphylococcus aureus" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US, vol. 99, no. 10, 14 May 2002 (2002-05-14), pages 6573-6578, XP002222373 ISSN: 0027-8424 the whole document</p>	1,2, 5-11, 14-37
Y	<p>KLADE C S: "PROTEOMICS APPROACHES TOWARDS ANTIGEN DISCOVERY AND VACCINE DEVELOPMENT" CURRENT OPINION IN MOLECULAR THERAPEUTICS, CURRENT DRUGS, LONDON,, GB, vol. 4, no. 3, June 2002 (2002-06), pages 216-223, XP009012456 ISSN: 1464-8431 page 219, left-hand column, paragraph 3 - page 220, right-hand column, paragraph 2</p>	1,2, 5-11, 14-37
Y	<p>TETTELIN H ET AL: "Complete genome sequence and comparative genomic analysis of an emerging human pathogen, serotype V Streptococcus agalactiae" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US, vol. 99, no. 19, 17 September 2002 (2002-09-17), pages 12391-12396, XP002268223 ISSN: 0027-8424 the whole document</p>	1,2, 5-11, 14-37

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/004856

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GLASER P ET AL: "Genome sequence of Streptococcus agalactiae, a pathogen causing invasive neonatal disease" MOLECULAR MICROBIOLOGY, BLACKWELL SCIENTIFIC, OXFORD, GB, vol. 45, no. 6, 27 September 2002 (2002-09-27), pages 1499-1513, XP002268222 ISSN: 0950-382X cited in the application the whole document	1,2, 5-11, 14-37
A	MOYO S R ET AL: "THE PUTATIVE R1 PROTEIN OF STREPTOCOCCUS AGALACTIAE AS SEROTYPE MARKER AND TARGET OF PROTECTIVE ANTIBODIES" APMIS, COPENHAGEN, DK, vol. 109, no. 12, 2001, pages 842-848, XP001053581 ISSN: 0903-4641 abstract	
A	BRODEUR B R ET AL: "Identification of group B streptococcal Sip protein, which elicits cross-protective immunity" INFECTION AND IMMUNITY, AMERICAN SOCIETY FOR MICROBIOLOGY, WASHINGTON, US, vol. 68, no. 10, October 2000 (2000-10), pages 5610-5618, XP002219117 ISSN: 0019-9567 cited in the application abstract	
A	MICHEL J L ET AL: "Cloned alpha and beta C-protein antigens of group B Streptococci elicit protective immunity" INFECTION AND IMMUNITY, AMERICAN SOCIETY FOR MICROBIOLOGY, WASHINGTON, US, vol. 59, no. 6, June 1991 (1991-06), pages 2023-2028, XP002107260 ISSN: 0019-9567 cited in the application abstract	
A	LARSSON C ET AL: "Protection against experimental infection with group B streptococcus by immunization with a bivalent protein vaccine" VACCINE, BUTTERWORTH SCIENTIFIC, GUILDFORD, GB, vol. 17, no. 5, February 1999 (1999-02), pages 454-458, XP004153828 ISSN: 0264-410X abstract	
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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/004856

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	<p>HUGHES MARTIN J G ET AL: "Novel protein vaccine candidates against Group B streptococcal infection identified using alkaline phosphatase fusions."  FEMS MICROBIOLOGY LETTERS,  vol. 222, no. 2, 28 May 2003 (2003-05-28),  pages 263-271, XP002304330  ISSN: 0378-1097  *ONLINE PUBLICATION DATE IS 30.04.2004,  see the first line above the abstract*  abstract</p> <p>-----</p>	
P,A	<p>HENICS T ET AL: "Small-fragment genomic libraries for the display of putative epitopes from clinically significant pathogens"  BIOTECHNIQUES, EATON PUBLISHING, NATICK, US,  vol. 35, no. 1, July 2003 (2003-07), pages  196-200,202,20, XP002293668  ISSN: 0736-6205  the whole document</p> <p>-----</p>	

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2004/004856

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:  
  
Although claims 26 and 27 are directed to a method of treatment by surgery of the animal body, the search has been carried out and based on the alleged effects of the compound/composition.
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
  
1-2, 5-11, 14-37 (partially)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention 1: claims 1-2, 5-11, 14-37 (partially)

Subject-matter related to SEQ ID N°14 and the corresponding polypeptide having the SEQ ID N°231

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Inventions 2-229: claims 1-37 (partially)

Each of the nucleic acid having the SEQ IDs 1, 3, 5-15, 18-25, 27-30, 32-36, 39-68, 70-86, 90-101, 103-145, 147, 149-217, 435-448, 463-474 and the related subject-matter defines a separate invention.

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/EP2004/004856

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 02059148 A	01-08-2002	AT 410798 B	25-07-2003
		AT 1302001 A	15-12-2002
		BR 0207067 A	15-06-2004
		CA 2436057 A1	01-08-2002
		CZ 20032201 A3	17-03-2004
		WO 02059148 A2	01-08-2002
		EP 1355930 A2	29-10-2003
		JP 2004531476 T	14-10-2004
		NO 20033364 A	24-09-2003

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